PATENT & TRADEMARK OFFICE
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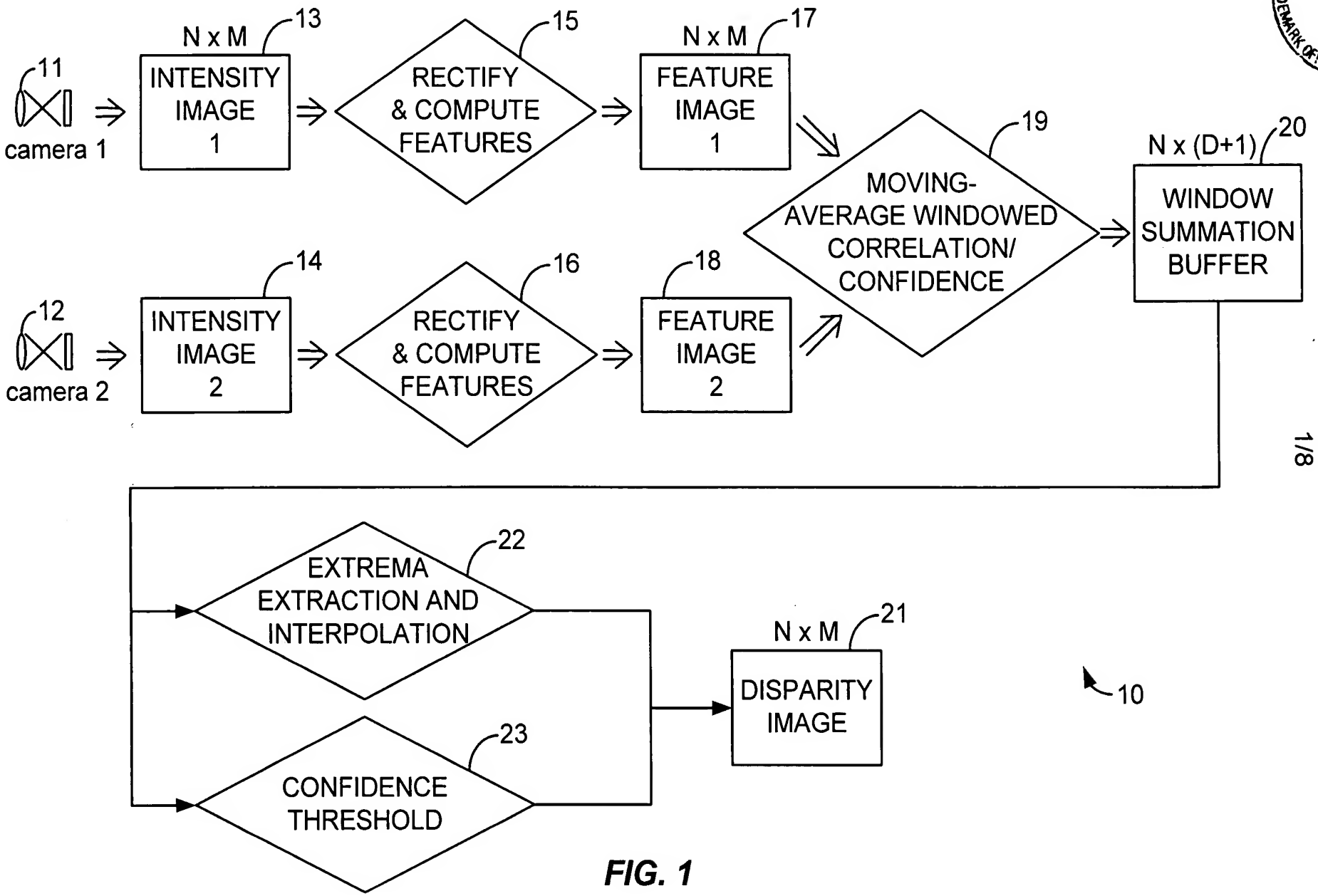

FIG. 1

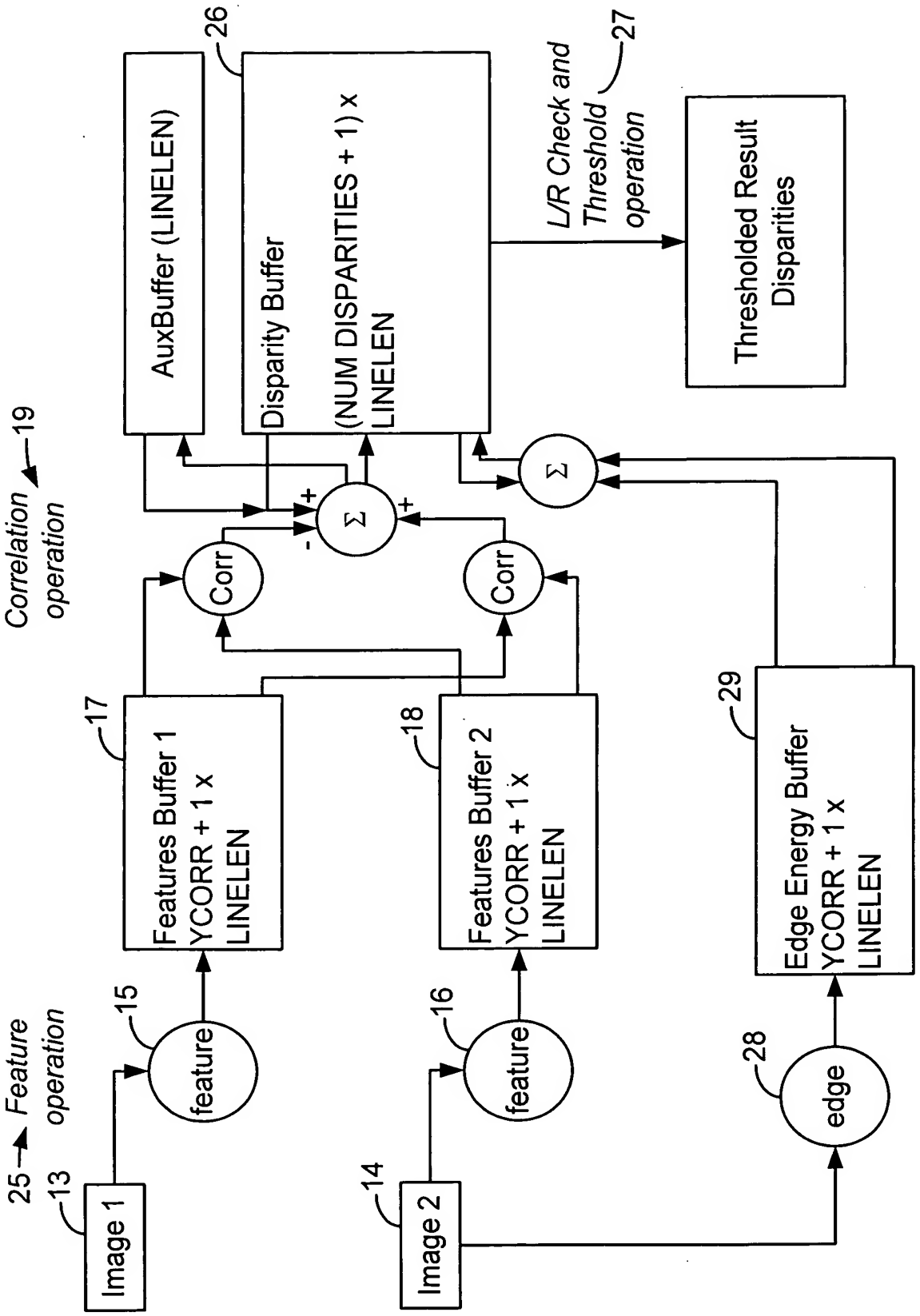
Image 1
13
Feature operation
25
feature
15
Features Buffer 1
YCORR + 1 x
LINELEN
17
Image 2
14
feature
16
Features Buffer 2
YCORR + 1 x
LINELEN
18
edge
28
Edge Energy Buffer
YCORR + 1 x
LINELEN
29
Corr
Corr
Σ
+
-
+
Σ
Correlation operation
19
AuxBuffer (LINELEN)
Disparity Buffer
(NUM DISPARITIES + 1) x
LINELEN
26
L/R Check and Threshold operation
27
Thresholded Result
Disparities

FIG. 2

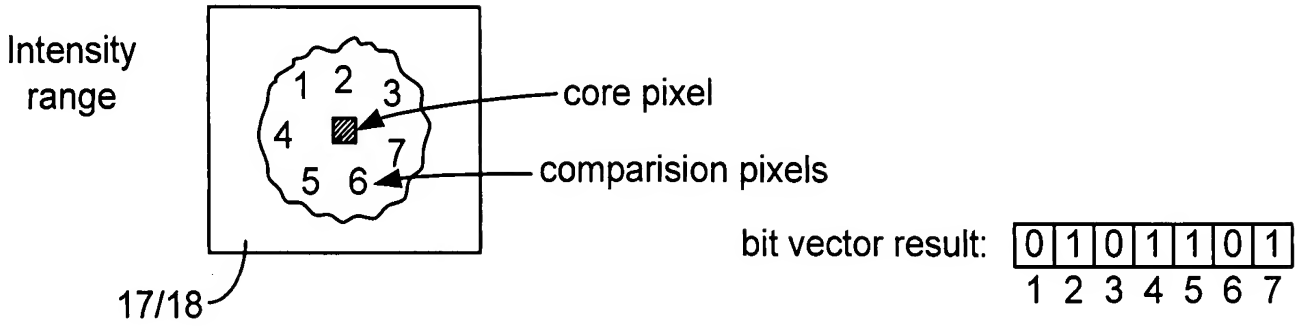
Intensity range
1 2 3
4
7
5 6
core pixel
comparision pixels
bit vector result:
0 1 0 1 1 0 1
1 2 3 4 5 6 7
17/18

FIG. 3(a)

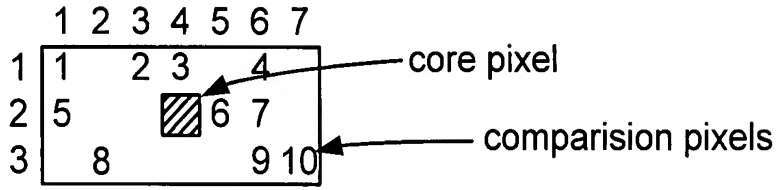
1 2 3 4 5 6 7
1
2
3
1
2 3
4
5
6 7
8
9 10
core pixel
comparision pixels

FIG. 3(b)

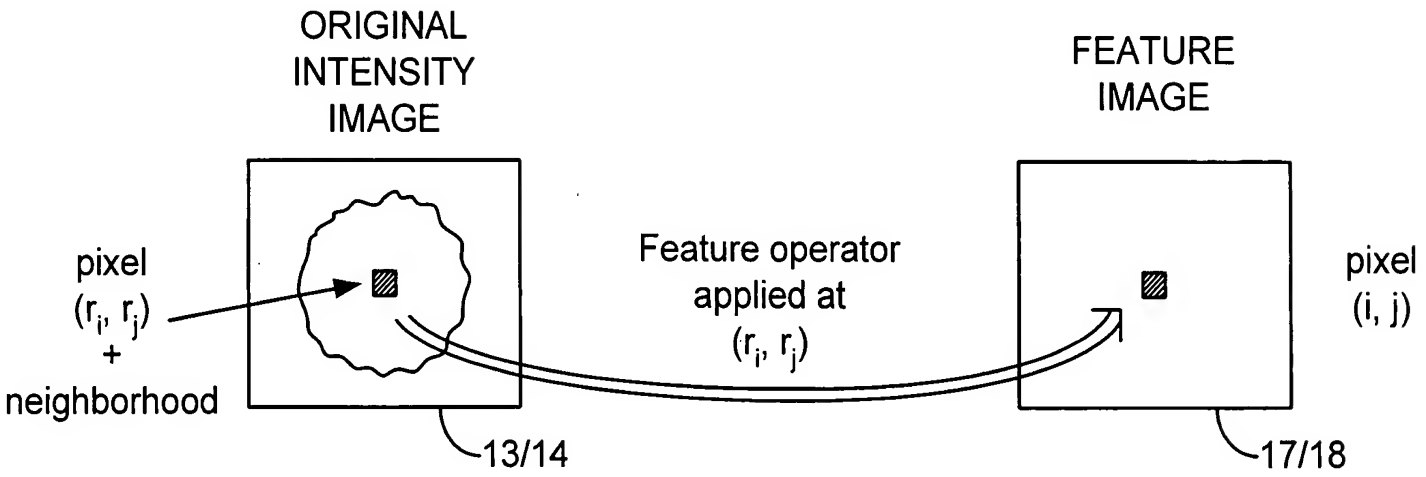
ORIGINAL
INTENSITY
IMAGE
FEATURE
IMAGE
pixel
(r_i, r_j)
+
neighborhood
Feature operator
applied at
(r_i, r_j)
pixel
(i, j)
13/14
17/18

FIG. 4(a)

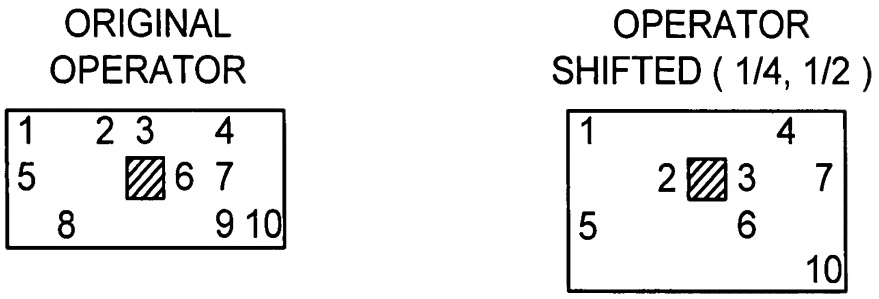
ORIGINAL
OPERATOR
1 2 3 4
5 6 7
8 9 10
OPERATOR
SHIFTED (1/4, 1/2)
1 4
2 3 7
5 6
10

FIG. 4(b)

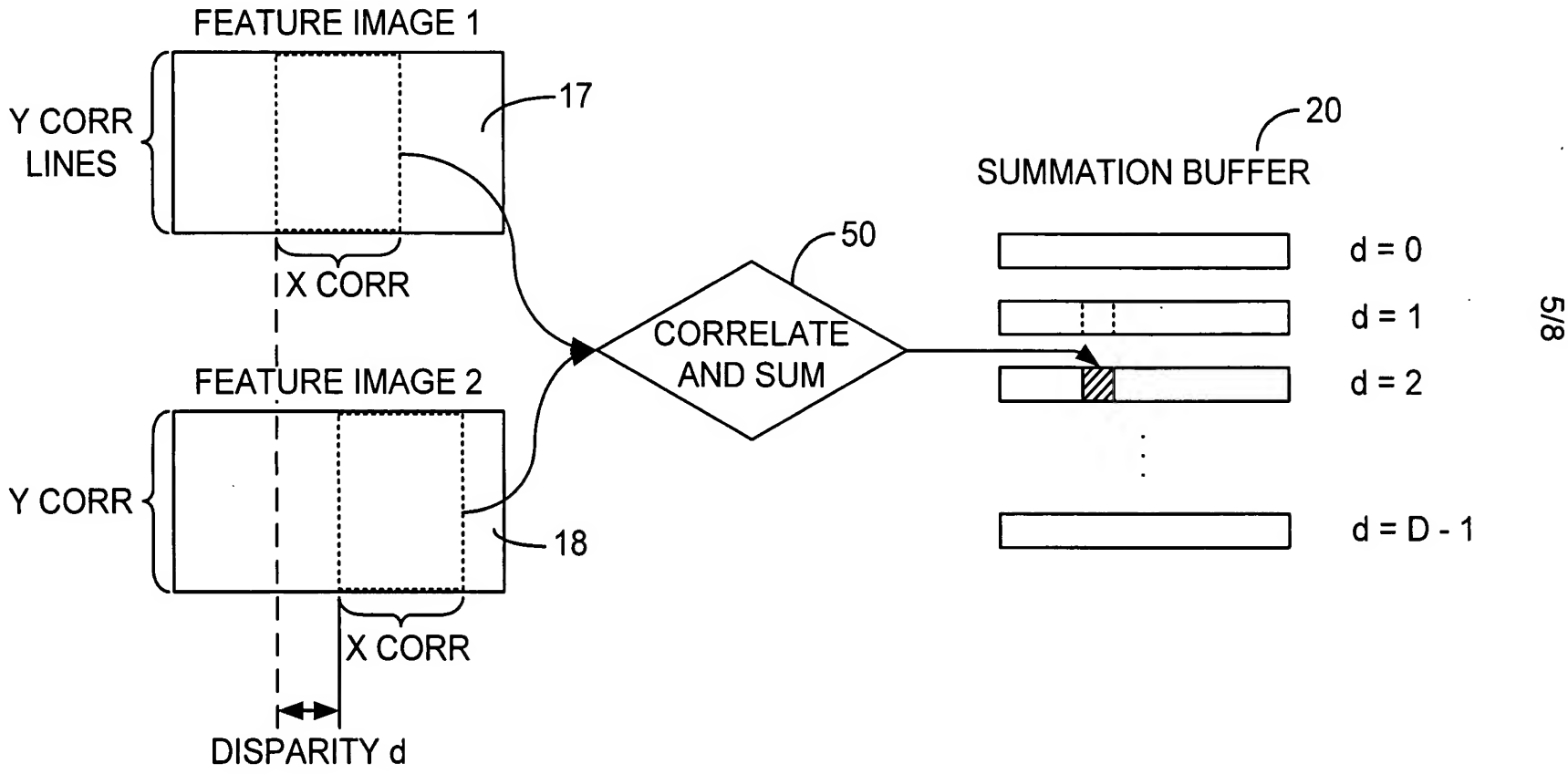
FEATURE IMAGE 1
Y CORR LINES
17
X CORR
FEATURE IMAGE 2
Y CORR
18
X CORR
DISPARITY d
50
CORRELATE AND SUM
20
SUMMATION BUFFER
d = 0
d = 1
d = 2
d = D - 1

FIG. 5

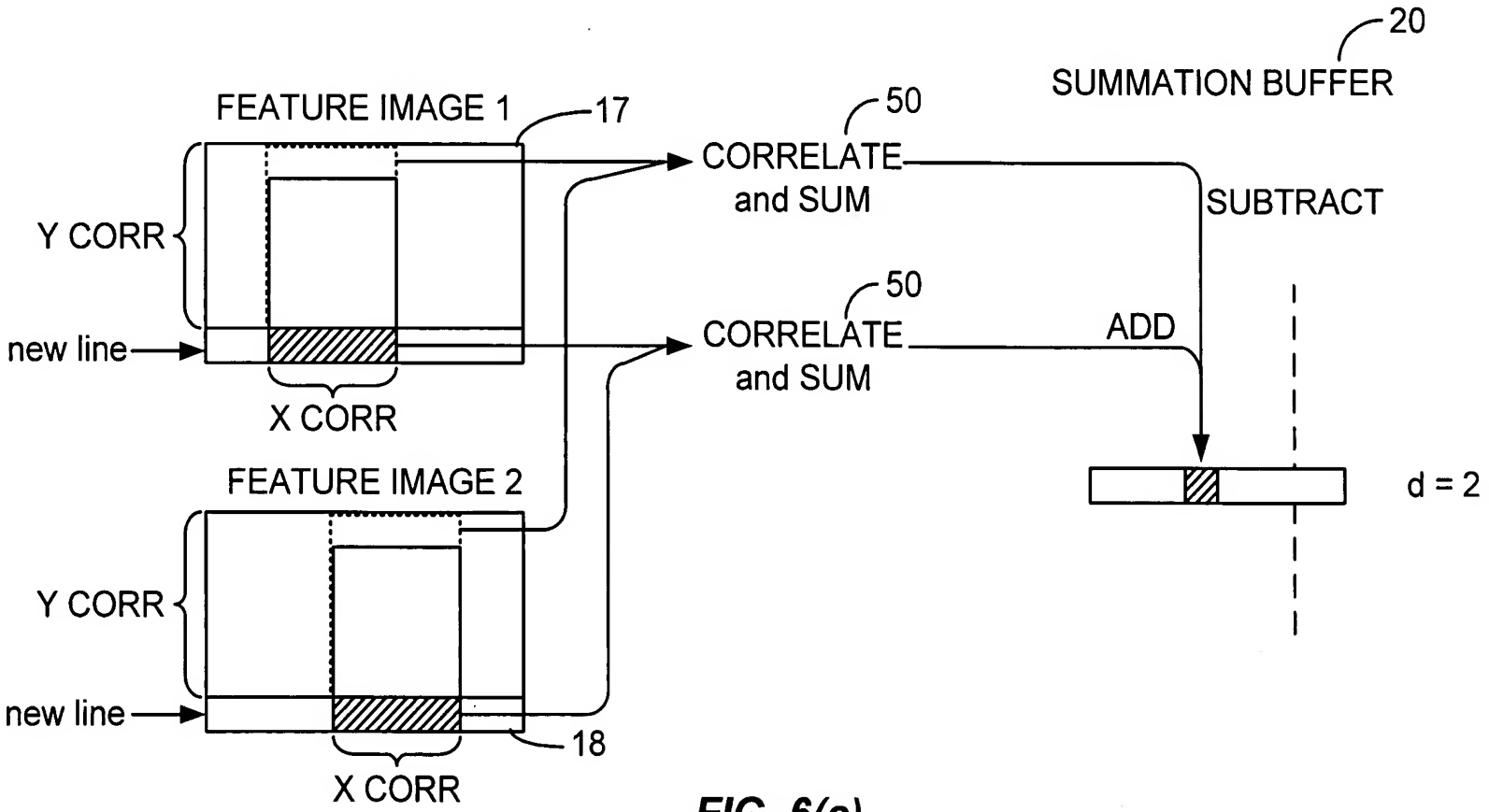
20
SUMMATION BUFFER
FEATURE IMAGE 1
17
50
CORRELATE
and SUM
SUBTRACT
Y CORR
new line
X CORR
50
CORRELATE
and SUM
ADD
FEATURE IMAGE 2
d = 2
Y CORR
new line
18
X CORR

FIG. 6(a)

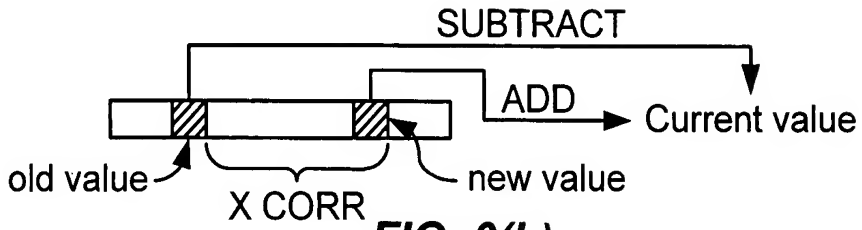
SUBTRACT
ADD
Current value
old value
X CORR
new value

FIG. 6(b)

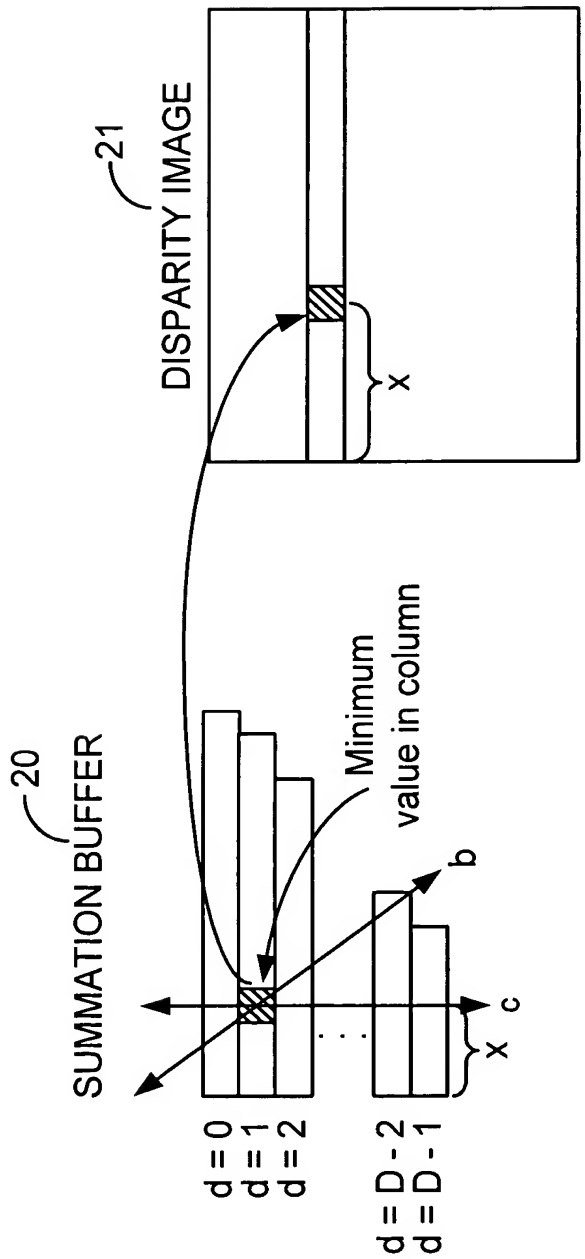
20
SUMMATION BUFFER
21
DISPARITY IMAGE
Minimum
value in column
x
b
c
d = 0
d = 1
d = 2
d = D - 2
d = D - 1

FIG. 7

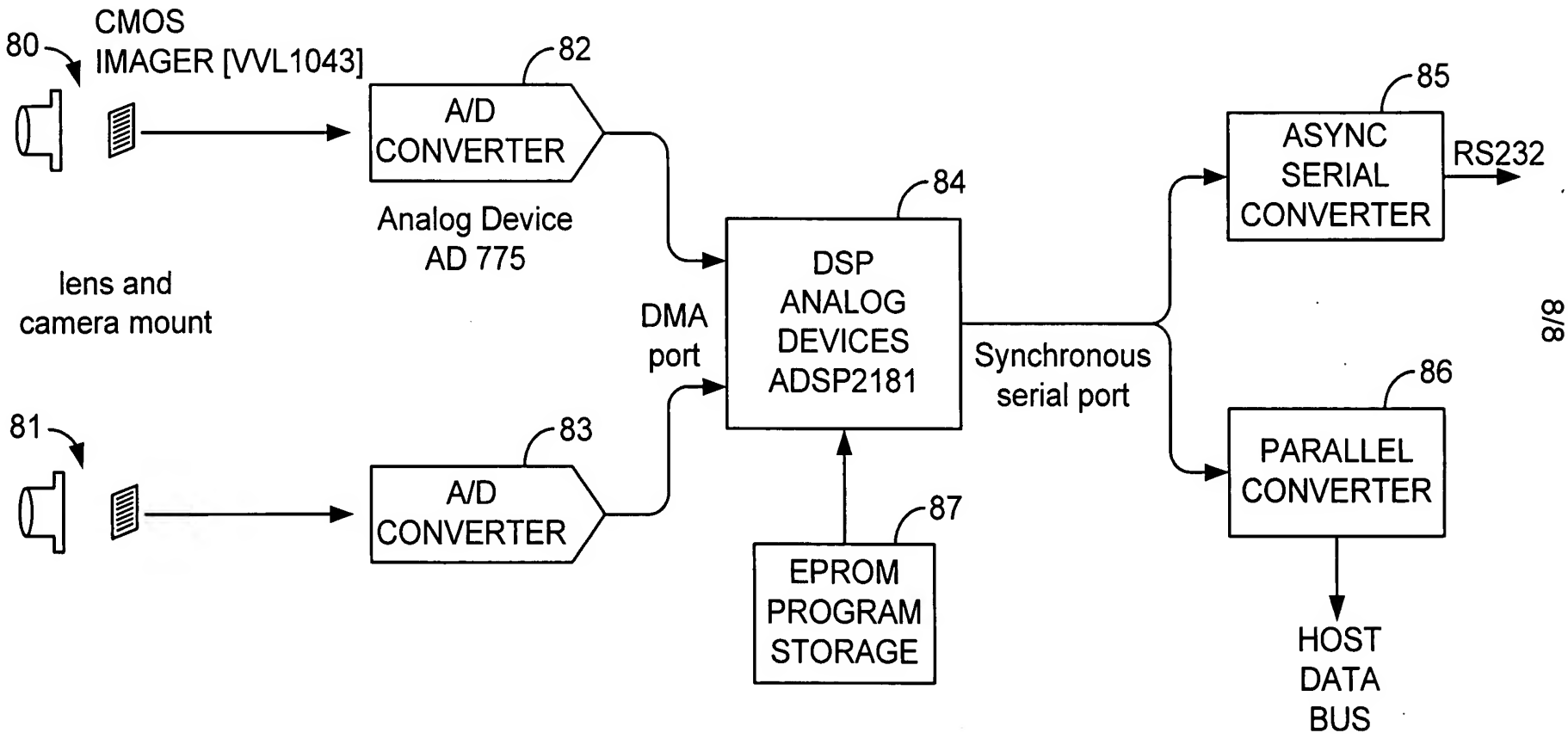
80
CMOS
IMAGER [VVL1043]
82
A/D
CONVERTER
Analog Device
AD 775
lens and
camera mount
81
83
A/D
CONVERTER
DMA
port
84
DSP
ANALOG
DEVICES
ADSP2181
87
EPROM
PROGRAM
STORAGE
Synchronous
serial port
85
ASYNC
SERIAL
CONVERTER
RS232
86
PARALLEL
CONVERTER
HOST
DATA
BUS

FIG. 8